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## INTERNAL CONTROL DEVICE FOR LIMPS SPEED A DOUBLES CLUTCH

AND PROCEEDED OF TRAINING OF the POSITIONS OF SELECTION OF the REPORTS/RATIOS the present invention refers to the internal order gear boxes.

The invention finds an application privileged in a gear box to automated or robotized order, i.e. whose whole of the actuators, of ordering of clutch, selection and engagement of the reports/ratios is placed under the control of a fascinating calculator in load whole or part of the decisions of order in the place of the driver.

The applicant described an internal control device of a gear box in the French patent application N 03 00760 of January 24, 2003.

io a control device interns of a gear box was also described in the US patent 4430904.

In these control devices, the selection and the passage of the reports/ratios of the gear box are ensured by a selector made up of a barrel of selection and a carriage of passage concentric the barrel and laid out inside this one. The barrel is fixed axially and mobile in rotation to actuate rolling, the this carriage segment presenting of the fingers moving des' bodies to engage the speed ratios and the barrel present of the peripheral sectors of larger diameter cooperating with means of drive of the above mentioned bodies.

If the order includes/understands several fingers of passage speeds, the fitting of the fingers of passage not being symmetrical, compared to the axis of rotation, each speed ratio can be committed only with one well specified finger and not with another.

The goal of this invention is to propose an internal control device of a gear box, in which each speed ratio can be engaged with any finger and there is not any thrust in the rotational movement of these fingers.

The invention thus aims an internal control device of mechanical gear box in which the selection and the passage of all the reports/ratios of the box are ensured by a selector made up of a barrel of selection and a carriage of passage concentric the barrel and laid out inside this one, the barrel is fixed axially and mobile in rotation to actuate rolling the segment, this carriage presenting of the fingers moving of the bodies to engage the speed ratios, the barrel presenting of the peripheral sectors of larger diameter cooperating with means of drive of the above mentioned bodies.

▲ 10p According to the invention, this control device is characterized in that the number of fingers is equal to the number of peripheral sectors, these fingers and these sectors peripheral being symmetrically laid out compared to the axis of the io barrel, each finger lying between two peripheral sectors.

In the simplest case, the number of fingers and the number of peripheral sectors are equal to two.

Preferably, the fingers are laid out between the peripheral sectors and the angular difference between the peripheral fingers and sectors is constant.

Preferably also, the peripheral fingers and sectors are interdependent of a common axis of rotation.

According to another characteristic of the invention, the peripheral fingers and sectors are assembled in rotation, without thrust likely to limit this rotation.

In the control device according to the invention, each finger is adapted to order the engagement of any speed ratio.

The fact of being able to engage each speed with any finger because those play of the symmetrical roles makes it possible to increase considerably the functionalities of the internal order which becomes, because of this solution, capable to carry out jumps of reports/ratios under couple.

The absence of butted against the movement of selection allows a continuous rotation of the unit consisted the fingers of passage of the speed ratios and the peripheral sectors (devices of n-key rollover), without never being blocked by possible obstinate which would make impossible the change of report/ratio following.

In practice, the rotational movement of the unit above is ordered by an electric motor which itself is ordered by a control unit.

Other characteristics and advantages of the invention will still appear Ci-5 afterwards throughout description.

With the annexed drawings, given as examples, nonrestrictive: figure 1 is a sight in prospect for an internal control device for gear box to double clutch according to the invention, - figure 2 are another sight in prospect for the device for io order according to the invention, - figure 3 and one front view of the control device according to the invention, - figures 4 to 10 are diagrams showing the various positions of selection of the control device according to the invention.

The device according to the invention includes/understands a whole of forks 230, 240, 250, 260 to engage the speed ratios.

The selection and the passage of the speed ratios are ensured by a selector 310 composed of a barrel of selection 211 and a concentric carriage of passage 220 the barrel and laid out inside this last. Barrel 211 is fixed axially and mobile in rotation and rotates carriage 220.

Carriage 220 presents radial fingers 221, 222 being able to move the axes of forks 230, 240, 250, 260 to engage the reports/ratios speeds.

In addition, barrel 211 presents peripheral sectors 212, 213 co-operator with direct-drive dog clutches 252, 262, 272, 282 of drive of the axes of forks 230, 240, 250, 260.

The number of fingers 221, 222 is equal to the number of peripheral sectors 212, 213, these fingers and these sectors peripheral being symmetrically laid out compared to the axis of barrel 211, each finger 221, 222 lying between two peripheral sectors 212, 213.

In the example represented on figures 1 to 3, the number of fingers and the number of peripheral sectors are equal to two.

In addition, fingers 221, 222 are laid out between the peripheral sectors 212, 213 and the angular difference between the peripheral fingers and sectors is constant, i.e. equal to 90.

Moreover, the fingers 221, 222 and the peripheral sectors 212, 213 are 5 interdependent of a common axis of rotation.

Moreover, the unit consisted the fingers 221, 222 and the peripheral sectors 212, 213 is assembled in rotation for example by means of an electric motor, without no thrust being likely to limit this rotation.

Each finger 221, 222 is adapted to order the engagement of io any speed ratio.

The fact of being able to engage each speed with any finger because those play of the symmetrical roles makes it possible to increase considerably the functionalities of the internal order which becomes, because of solution according to the invention, capable to carry out jumps of reports/

ratios under couple.

The absence of butted against the movement of the selections allows a continuous rotation of this whole at the time of the sequence of the changes of report/ratio without never being blocked by possible obstinate which would make impossible the change of report/ratio following.

The diagrams represented on figures 4 to 10 show various angular positions of fingers 221, 222 and of the peripheral sectors 212, 213 compared to direct-drive dog clutches 252, 262, 282 and 272, respectively in the positions reverse gear MAR and the speed ratios 1, 2, 3, 4, 5 and 6.

As shown on these figures, reference 252 indicates the direct-drive dog clutch making it possible to order the passage of reports/ratios 1 and 5, 262 indicates that which orders the passage of reports/ratios 2 and 6, 282 the passage only of report/ratio 3 and 272 that of reverse gear MAR and report/ratio 4.

Figures 6 to 12 also reveal, in the various positions, the speed ratios which can be reached directly without rupture of couple and those being able to be reached with rupture of couple with the corresponding movement of selection.

These figures 6 to 12 thus illustrate the advantages obtained by the control device according to the invention.